

EXHIBIT J

United States Patent [19]

Lee

[11] **3,890,988**[45] **June 24, 1975****[54] CLEANING ASSEMBLY FOR AUTOMOTIVE PARTS AND THE LIKE**[75] Inventor: **Edward Lee, Winnipeg, Canada**[73] Assignee: **Solv-X Inc., Rexdale, Canada**[22] Filed: **July 13, 1973**[21] Appl. No.: **378,953****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 187,820, Oct. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 167,109, July 29, 1971, abandoned.

[52] U.S. Cl. **134/111; 21/60.5 R; 134/10; 134/40; 134/104; 210/167**[51] Int. Cl. **B08b 3/02; B08b 3/08; C23g 5/04**[58] Field of Search **134/40, 111; 99/408; 210/167, 169; 415/121 G; 417/360****[56] References Cited****UNITED STATES PATENTS**

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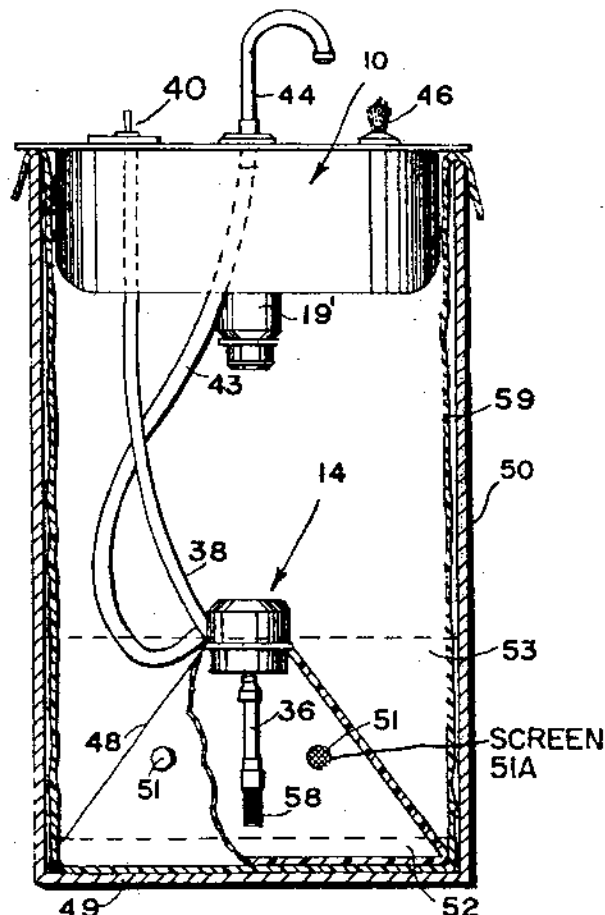
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*Primary Examiner—Daniel Blum**Attorney, Agent, or Firm—Stanley G. Ade***[57]****ABSTRACT**

A metal sink with a faucet seats over a container in which is situated a pump having a screened intake and being connected to the faucet. The pump is supported on a cone or deflector support and the contaminated solvent discharges by gravity from the sink onto the cone which spreads it circumferentially and acts as a primary separator or filter. A layer of water acts as a trap for grease and oil contaminants and the pump, which is situated in the solvent within the cone, is provided with a relatively fine screen on the intake side thereof. A plastic liner in the container permits disposal of contaminants and the like thereby eliminating undesirable discharge of the contaminants into the sewage disposal system.

8 Claims, 8 Drawing Figures

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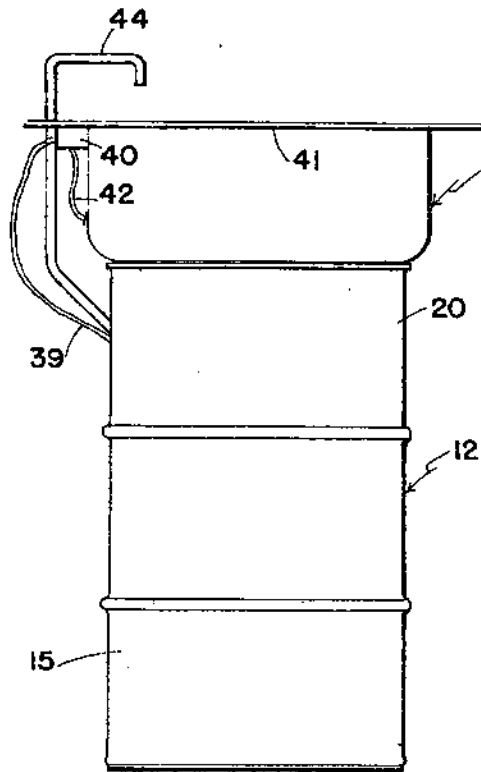


FIG. 1

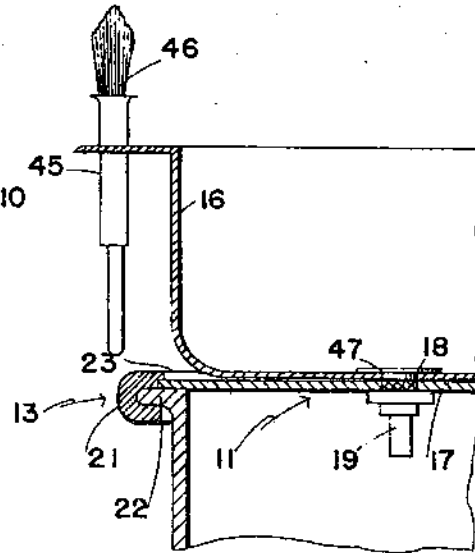


FIG. 2

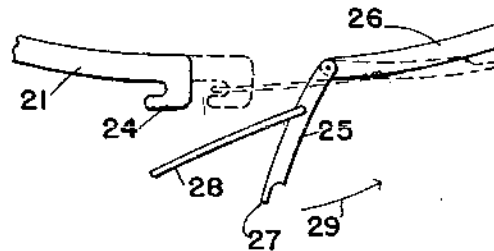


FIG. 3

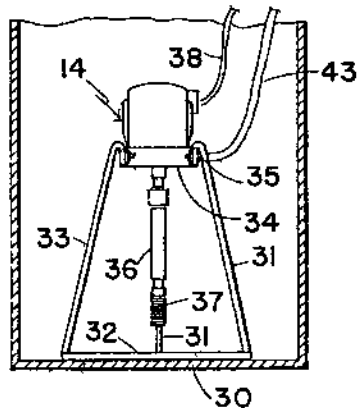


FIG. 4

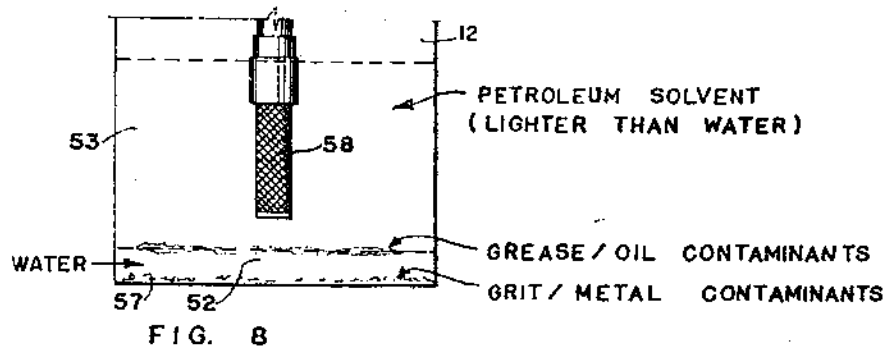
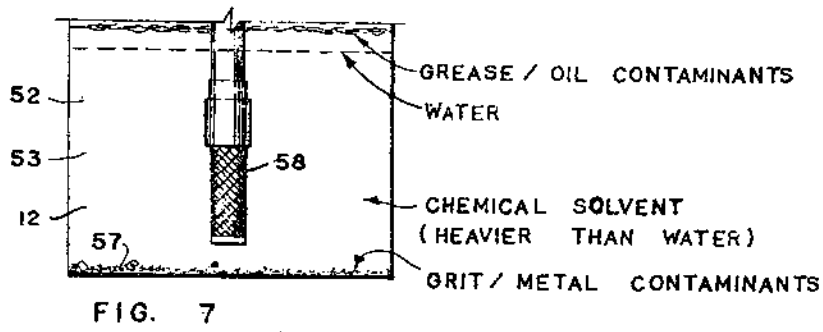
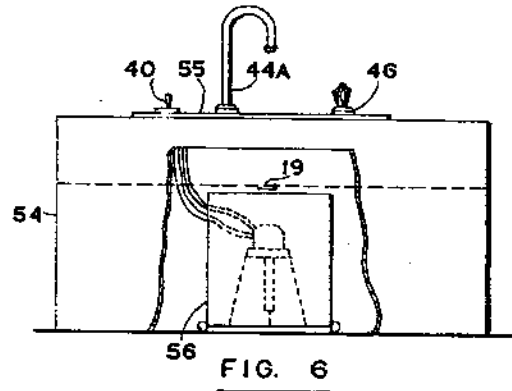
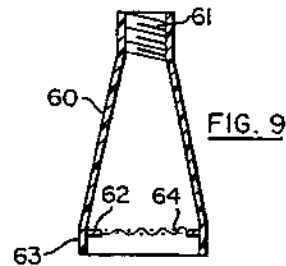
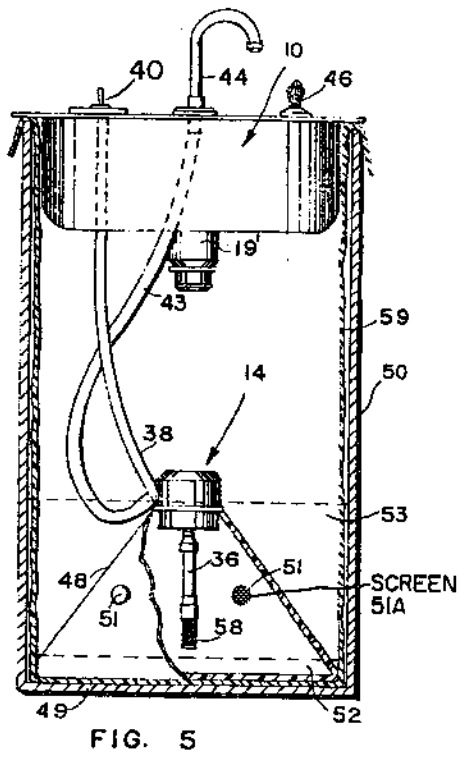
INVENTOR
BY EDWARD LEE
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CLEANING ASSEMBLY FOR AUTOMOTIVE PARTS AND THE LIKE

This invention constitutes a continuation-in-part application of Ser. No. 187,820, filed Oct. 8, 1971 (now abandoned), which in turn is a continuation-in-part application of Ser. No. 167,109, filed July 29, 1971 (now abandoned).

BACKGROUND OF THE INVENTION

Normally automotive parts and the like are cleaned in a receptacle in a cleaning fluid which is then either disposed of or else allowed to settle out in a container whereupon it may be used again. However, this is expensive in practice and if the cleaning fluid is allowed to settle out in a separate container, time and effort are involved in transferring the fluids from one container to the other apart from adding to storage problems and the like.

SUMMARY OF THE INVENTION

The present invention now overcomes these disadvantages by providing a receptacle adapted to seat over a container and to be detachably secured thereto. A submersible pump in the container pumps fluid to the receptacle and after use it drains back whereupon the dirt settles out by gravity so that the clean fluid can be picked up and used again, it being understood that the intake to the pump is spaced above the base of the container. A water layer is used to trap the oil and grease contaminants and retard their solution into the solvent thus extending the use time of the solvent considerably.

The principal object and essence of the invention is therefore to provide a device of the character herewithin described which is adapted to be detachably secured to a container and which includes a pump to pump the fluid from the container to the receptacle and to permit it to drain back into the container after use whereupon the dirt may settle out by gravity assisted by a primary separation and a secondary separation due to the provision of a fine screen on the pump.

Another object of the invention is to provide a device of the character herewithin described which is suitable for use with a conventional 45 gal. oil drum or the like if desired, inasmuch as means are provided to detachably clamp the receptacle to the top of an oil drum.

A still further object of the invention is to provide a device of the character herewithin described which is self contained and does not require the transfer of fluid from one container to the other as in conventional cleaners.

A further object of the invention is to provide a device of the character herewithin described which utilizes a water layer above the solvent if same is heavier than water or below the solvent if same is lighter than water in order to trap the grease and oil contaminants and retard the dissolution thereof by the solvent.

A still further object of the invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture and otherwise well suited to the purpose for which it is designed.

With the foregoing objects in view, and other such objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, refer-

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ence being had to the accompanying drawings in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevation of the device situated upon an oil drum.

FIG. 2 is an enlarged fragmentary sectioned view showing the method of securing the receptacle to the container.

FIG. 3 is a fragmentary top plan view showing the method of fastening the locking ring.

FIG. 4 is a fragmentary sectional view of the base of the container showing the pump and motor combination supported upon its stand.

FIG. 5 is a front elevation, partially sectioned, of the preferred embodiment.

FIG. 6 is a front elevation of a modification suitable for use in a relatively large installation.

FIG. 7 is a schematic view showing the relationship of the solvent and water with a chemical or heavier than water solvent.

FIG. 8 is a view similar to FIG. 7 but with a petroleum or lighter than water solvent.

FIG. 9 is an enlarged cross sectional view of one embodiment of the secondary filter element per se.

In the drawings like characters of reference indicate corresponding parts in the different figures.

PRELIMINARY DESCRIPTION

A parts cleaning receptacle 10 is secured to a support plate 11 which in turn may be engaged over the upper end of a suitable container 12 and be secured thereto by means of a locking clamp assembly 13. A pump and motor combination 14 is supported within the container with the intake being spaced from the base of the container and is operatively connected to a source of power and to the receptacle.

DETAILED DESCRIPTION

In the accompanying description and in FIGS. 1 to 4 inclusive of the drawings, the container 12 is shown as consisting of a conventional oil drum 15 but of course it will be appreciated that any suitable form of container can be used.

The receptacle 10, in this embodiment, consists of a conventional metal sink 16 which is secured by the base thereof to a circular support plate 17 which acts as a cover plate for the container 15. The conventional drain and strainer combination 18 in the base of the receptacle 16 communicates with the interior of the container via a drain assembly 19 secured to the support plate 17.

The support plate carrying the receptacle fits over the upper end 20 of the container and the clamping assembly 13 detachably holds the support plate together with the receptacle firmly in position upon the container 15. This clamping assembly includes a resilient locking ring 21, which is U-shaped in cross sectional configuration, and which engages the peripheral external head 22 forming the upper extremity of the container and also around the periphery 23 of the support plate 17 as illustrated in FIG. 2.

FIG. 3 shows one method of locking the clamping assembly which consists of a hooked end 24 on one end of the ring 21 and an over center locking arrangement 25 pivotally secured to the other end 26 of the ring 21. The locking assembly 25 includes the main lever 27

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and an elongated loop component 28 pivoted by one end thereof intermediate the end of the locking lever 27. This loop is adapted to engage over the hooked end 24 whereupon the locking lever is moved in the direction of arrow 29 until it assumes the position shown in phantom in FIG. 3 thus drawing the locking ring firmly into position and maintaining it in the closed position due to the over center relationship.

Situated within the container 15 and supported by the base 30 thereof is a stand 31 adapted to support the pump and motor combination 14.

This stand includes a circular base 32 and a tripod arrangement of legs 33 extending upwardly and inwardly from the base 32, terminating in a ring 34 which receives the pump and motor combination 14 therein. Clamping bolts 35 hold the pump and motor combination in the desired position within the stand.

This pump and motor combination includes an intake tube 36 extending downwardly therefrom including a relatively fine screened intake 37 which terminates spaced from the base 30 as clearly shown in FIG. 4.

The pump and motor combination is of course submersible and includes shielded electrical conductors 38 which extend exteriorally of the container as illustrated at 39 and communicates with a switch 40 supported by the rim 41 of the receptacle. Further electrical conduits 42 are connectable to a source of electrical power in the usual way (not illustrated).

A hose 43 also extends from the pump and motor combination 14, upwardly within the container and then extends through an aperture in the side wall adjacent the upper end 20. This connects to a discharge nozzle or outlet 44 also secured upon the rim 41 of the receptacle and adjacent this discharge nozzle or outlet is a relatively short length of tubing 45 adapted to receive and store a cleaning brush 46.

In operation, cleaning fluid (not illustrated) is held within the container and when it is desired to clean parts, a stopper 47 or the like covers the drain 18 and switch 40 operates pump and motor combination 14 thus pumping fluid from the container, through the nozzle 44 and into the receptacle.

After parts have been cleaned, the stopper 47 is removed thus allowing the contaminated fluid to drain back into the tank by gravity. Inasmuch as the majority of contaminants normally found on automotive parts and the like consist of solids, these solids settle out by gravity in the base of the container thus leaving the relatively clean cleaning fluid thereabove to be picked up by the spaced intake 37 when further use is required.

FIGS. 5 to 9 inclusive show the preferred embodiment particularly suitable for use on parts and the like contaminated with heavy grease and oil as well as dirt, grit and metal particles.

In FIG. 5 the support comprises a cone 48 resting on the base 49 of a container 50 and carrying the pump and motor 14 at the apex thereof with the intake 36 depending downwardly into the cone. Apertures 51 in the wall of the cone communicate with the remainder of the container and act as solvent intakes to the interior of the cone and these apertures may be covered by screening 51A if desired.

This cone 48 which is frusto-conical not only acts as a support for the pump and motor 14 but also as a primary separator or divider. It will be noted that the sink discharge 19' is situated immediately over the apex or upper end of the cone 48 so that contaminated solvents

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being discharged into the container, strikes the motor and cone which spreads this solvent radially outwardly and downwardly towards the walls of the container. This has the effect of allowing any solids to be deposited by gravity adjacent the side walls of the container, said solids being indicated in FIGS. 7 and 8 by reference character 57. Furthermore, inasmuch as the solvent enters the cone through the apertures 51, there is little danger of these solids being drawn into the interior of the cone where they might be picked up by the pump and motor assembly 14.

This enables the intake tube 36 of the pump to be provided with a relatively fine secondary filter or screen 58 without the danger of this secondary filter becoming clogged with contaminants and this screen is usually between 80 - 200 mesh size.

Furthermore, it should also be appreciated that when the pump and motor assembly is switched off, the head of solvent within the tube 43 leading to the outlet nozzle 44, permits the solvent within this tube 43 to drain back through the pump and motor assembly and out of the filter screen 58 thus cleaning any contaminants from this filter and preventing undesirable clogging from taking place.

Of importance in this application is the provision of a layer of water 52 as well as the main bulk of cleaning fluid 53 which assists in removing and trapping contaminants from the cleaning solution or solvent.

If the solvent being used is a petroleum based solvent then usually it is lighter than water so that it would float on the upper surface of the water as indicated in FIG. 8. However, heavy oils and greases which have been removed from parts being cleaned by the device, are trapped within the boundary layer between the water and solvent with very little surface area of these contaminants being exposed to the action of the solvent. This prevents or at least retards considerably any dissolution of these grease and oil fractions by the solvent and enables the solvent to be used for a longer period of time than is usual.

If, however, a chemical solvent is used, this is normally heavier than water under which circumstances the layer of water 52 will rise to the upper surface of this solvent as shown in FIG. 7. In this case, of course, the grease and oil contaminants float to the surface of the water layer and do not come into contact with the solvent at all. Therefore the only dissolution of oils and greases which might occur is during the washing action and while the contaminated solvent is being discharged from the sink and it has been found that only relatively light oils will dissolve. Once again it enables the bulk of the solvent to be used for some considerable time before it becomes contaminated.

In both instances as illustrated in FIGS. 7 and 8, it will of course be appreciated that the solvent chosen must be non-soluble in water and many commercially available solvents both petroleum and chemical are available which meet these requirements.

FIG. 6 shows a relatively large counter 54 having a permanent sink 55 therein. The unit 56 consists of an open tank or container on castors (not illustrated) and connected by flexible hose to the discharge nozzle 44. A pump and motor assembly and stand are situated in the container and operate as in the previous embodiments.

In the embodiment shown in FIG. 5, a plastic liner or bag 59 is provided for the container 12, said liner or

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bag being placed in the container first whereupon the motor and pump 14 and the support is placed on the base of the container. The sink is then placed on top of the container after filling same with the combination of solvent and water as hereinbefore described.

When it is desired to remove heavy contamination from the container, the relatively clean solvent is pumped from the container through the nozzle 44, it being observed that the lower end of the screen intake 58 is always situated within the solvent layer but spaced from the base of the container. Once the solvent has been removed for further use, the sink can be removed together with the pump and motor and its support. At this point the top of the plastic bag can be folded and tied and the water together with the contaminants and a small layer of solvent may be disposed of by regular garbage disposal facilities. By the same token if it is desired to change or renew the solvent, the old solvent can also be disposed of within the liner or plastic bag 59.

Referring back to the chemical solvent or solvent that is heavier than water, as illustrated schematically in FIG. 7, the use of this, of course, has several advantages. First and foremost, the majority of chemical solvents are non-flammable or at least are provided with a relatively high flash point thus making them safe for use in the majority of commercial environments. Secondly, because of the provision of the water layer above the solvent, evaporation is reduced to the minimum thus reducing the amount of topping up which might be required.

When filling the container with a heavier than water solvent such as a chemical solvent, this is poured in first to the approximate level shown and then the relatively thin layer of water is poured in, care being taken to avoid undue turbulence.

It should also be noted that the cone type separator reduces considerably any turbulence within the container which of course facilitates the separation and trapping of the contaminants by the water layer.

When a lighter than water solvent such as a petroleum solvent is used, the layer of water is poured first and then the main bulk of the solvent. Once again care should be taken to ensure that the water is not agitated to the extent that it enters the cone through the holes 51. However, even if some water enters the apertures in the cone, it will float or sink depending upon the solvent used and will not affect the function of the device adversely providing water is not present at the pump inlet.

FIG. 9 shows the preferred embodiment of the secondary filter at the pump inlet and is identified by reference character 60.

It consists of a frusto-conical cone preferably made of plastic and having a screw threaded upper end 61 which enables it to be engaged upon the lower end of the pump intake specifically designated 36A in FIG. 7.

A frusto-conical cone 60 is hollow and is provided with an interior flange 62 extending inwardly and spaced from the lower end 63 and a relatively fine screen 64 is secured to this flange and spans the area defined by the flange as clearly illustrated.

The conical shape of the portion 60 assists in deflecting any fine particulate matter which may have entered the apertures 51 of the conical support 48, and prevents them from being drawn into the pump through the relatively fine screen 64.

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It should be stressed that the primary separator taking the form of the cone 48 deflects the particulate matter towards the walls of the container thus enabling a relatively fine screen to be used on the pump intake without any danger of this screen becoming clogged. This permits practically clean solvent to be recirculated by the pump.

In other words the novelty of the primary cone separator 48 in conjunction with the secondary filter is that it makes it possible to use a secondary filter with a fine screen without danger of it becoming clogged thereby achieving good positive filtration with a permanent filter and without the use of disposable filters. Without the cone deflector or primary separator, a pump filter with a relatively fine mesh will become clogged within seconds.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:

1. A cleaning assembly for machine parts and the like comprising in combination a container, a parts cleaning receptacle situated on the upper side of said container, nozzle means in said receptacle, and a drain in said receptacle discharging into said container, a pump and pump motor in said container operatively connected to said nozzle means, a pump intake on said pump, means to support said pump and pump motor, said pump intake being spaced from the base of said container, primary separator means in said container and relatively fine secondary filter means on said pump intake, said means to support said pump and pump motor also constituting said primary separator means, said primary separator means receiving solvent from said drain and directing said solvent towards the outer walls of said container, said primary separator means and said means to support said pump and pump motor comprising a frusto-conical support supported on the base of said container, said pump and said pump motor engaging within the open apex of said conical support, and solvent intake means formed in the walls of said conical support, the apex of said conical support being situated vertically below said fluid discharge drain.

2. The device according to claim 1 in which said secondary filter means on said pump intake includes a frusto-conical body portion secured by one end thereof to said pump intake and a screen across the other end of said body portion.

3. The device according to claim 2 in which said screen is spaced inwardly from said other end and spans the interior of said body portion.

4. In a cleaning assembly for machine parts and the like which includes a container, a parts cleaning receptacle situated on the upper side of said container, nozzle means in said receptacle and a drain in said receptacle discharging into said container, a pump and pump motor in said container operatively connected to said nozzle means and a pump intake on said pump; means to support said pump and pump motor, said pump intake being spaced from the base of said container, primary separator means in said container and relatively fine secondary filter means on said pump intake, said

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means to support said pump and pump motor also constituting said primary separator means, said primary separator means receiving solvent from said drain and directing said solvent to adjacent the outer walls of said container, said primary separator means and said 5 means to support said pump and pump motor comprising a frusto-conical support supported on the base of said container, said pump and pump motor engaging within the open apex of said conical support, and solvent intake means formed in the walls of said conical support.

5. The device according to claim 4 in which said secondary filter means on said pump intake includes a frusto-conical body portion secured by one end thereof to said pump intake and a screen across the other end 15 of said body portion.

6. In a cleaning assembly for machine parts and the like which includes a parts cleaning receptacle, an upright container adapted to hold liquid, upon which said receptacle engages, outlet means discharging into said 20 receptacle, drain means in said receptacle connecting with said container and a pump and pump motor in said container operatively connected to said outlet means;

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the improvement which is characterised by the combination of a primary separator in said container receiving solvent from said drain and directing said solvent to adjacent the outer walls of said container, secondary 5 filter means on the intake of said pump, a body of non-water-soluble solvent in said container, and a contaminant trapping water layer within said container but spaced from said intake, one of said body of solvent and water layers floating on the other, said primary separator taking the form of a frusto-conical support for said pump and motor means, said pump and motor means being situated within the upper open apex of said conical support, and solvent intake means formed in the walls of said support intermediate the ends 15 thereof, the apex of said conical support being situated vertically below the drain means in said receptacle.

7. The device according to claim 6 in which the specific gravity of said body of solvent is less than the specific gravity of water.

8. The device according to claim 6 in which the specific gravity of said body of solvent is greater than the specific gravity of water.

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EXHIBIT K

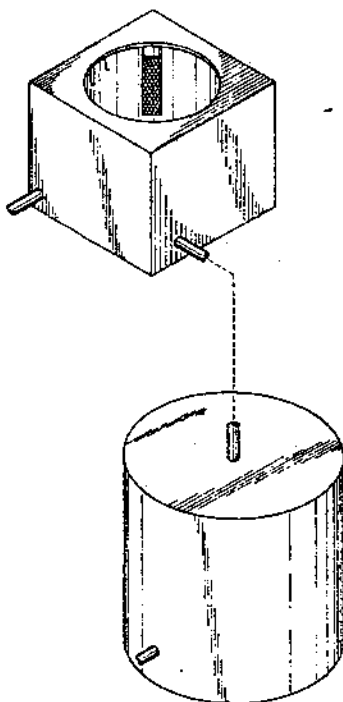
United States Patent [19]**Schinn**[11] **Patent Number:** **4,815,486**[45] **Date of Patent:** **Mar. 28, 1989**[54] **PAINT EQUIPMENT CLEANING
APPARATUS**[76] **Inventor:** **Dale R. Schinn, P.O. Box 6133,
Biloxi, Miss. 30532**[21] **Appl. No.:** **78,167**[22] **Filed:** **Jul. 27, 1987**[51] **Int. Cl.⁴** **B08B 3/04**[52] **U.S. Cl.** **134/111; 134/121;
134/155; 134/157**[58] **Field of Search** **134/111, 121, 135, 138,
134/139, 141, 155, 157; 68/23 R**[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Philip R. Coe
Attorney, Agent, or Firm—Leon Gilden[57] **ABSTRACT**

Paint equipment cleaning apparatus for performing the process of cleaning paint brushes, rollers, spray guns, and the like, includes the use of a pneumatically-powered equipment washing machine which holds a quantity of paint thinner or solvent. The painting equipment is moved through the solvent by the rotation of a holding drum in the washing machine, and the solvent is then removed so that the equipment may be spun dry through a rapid rotation of the drum. The removed solvent is pumped to a cleansing tank where it is filtered for reuse. The system is particularly adapted for use in a shipboard environment.

1 Claim, 2 Drawing Sheets

U.S. Patent

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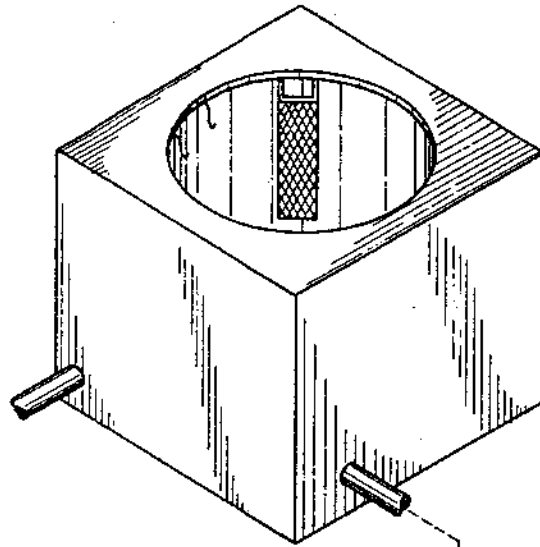
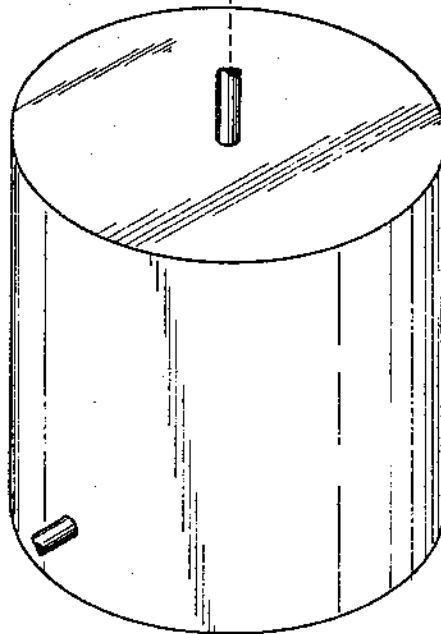


FIG 1



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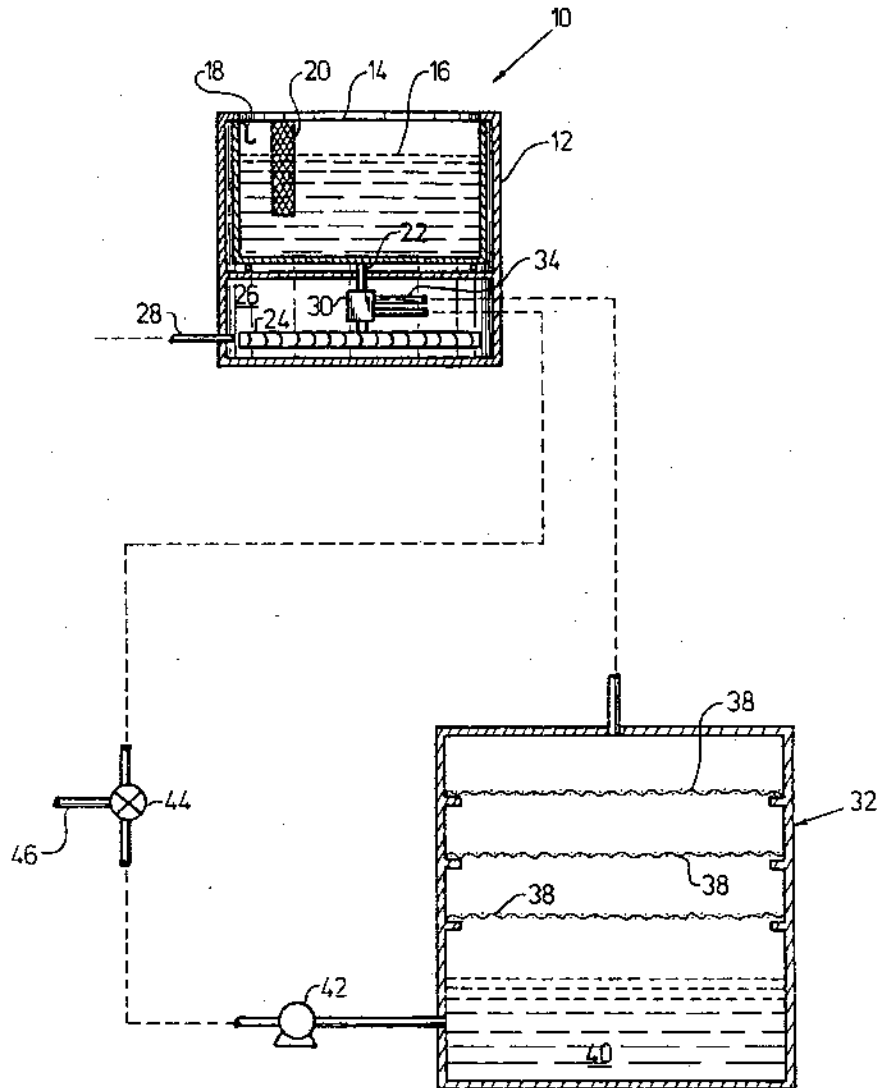


FIG 2

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PAINT EQUIPMENT CLEANING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to painting equipment, and more particularly pertains to a new and improved apparatus and for cleaning paint brushes, paint rollers and paint spray equipment.

2. Description of the Prior Art

The use of specially designed equipment for cleaning paint brushes, paint rollers and paint spraying equipment is well known in the prior art. A typical paint brush cleaning apparatus is disclosed in U.S. Pat. No. 2,449,818, which issued to A. Olsen on Sept. 21, 1948. In the Olsen device, a paint brush is rotatably retained within a bucket of paint thinner, and through the rotatable movement of a manually actuatable handle, the brush is rotated within the thinner until substantially clean. The brush may then be removed for drying purposes. As will be noted in reference to this patent, the Olsen device is designed to hold and clean only one paint brush at a time, and a substantial amount of time and manual effort is required to clean the brush. Further, no means are provided for recycling and thus reusing the paint solvent contained within the device.

As to various prior art methods and apparatuses for cleaning paint rollers, a good typical example is to be found in U.S. Pat. No. 2,542,491, which issued to A. Engel on Feb. 20, 1951. The Engel device provides a holder by which a used paint roller may be attached to an electric drill. The paint roller may then be inserted into a bucket of paint thinner and is cleaned by being rotated within the thinner through an actuation of the drill. After cleansing, the roller is removed from the solvent and allowed to dry. Again, however, no means are provided for cleansing and reusing the paint thinner, and additionally, only a single paint roller can be cleaned at any given time.

There has been at least one attempt to manufacture an apparatus for cleaning and drying paint equipment wherein a plurality of items can be cleansed simultaneously with one container. In this regard, reference is made to U.S. Pat. No. 2,965,111, which issued to S. Feigelman on Dec. 20, 1960. The device shown in this patent includes a housing having a quantity of paint solvent retained therein, and a holding rack allows for the positioning of a plurality of paint brushes and rollers within the solvent. A handle on the housing allows the same to be manually agitated to effect a cleansing of the equipment. Additionally, the equipment may then be hung to dry within the housing above the surface level of the solvent. No means are illustrated for cleansing the solvent for purposes of reuse, and the agitation of the housing must be manually performed.

Accordingly, it would appear that there exists a continuing need for new and improved apparatuses and processes for cleansing paint equipment wherein a large quantity of equipment could be simultaneously cleaned with little or no effort being provided by the user of the equipment. In this respect, the present invention substantially addresses this need.

SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of apparatuses for cleaning painting equipment now present in the prior art, the present invention provides an improved apparatus and associ-

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ated process for cleaning painting equipment wherein a pneumatically-powered rotatable washing machine is utilized to effect a cleansing thereof. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved apparatus and process for cleaning painting equipment which has all the advantages of the prior art apparatuses and processes for cleaning such equipment and none of the disadvantages.

To attain this, the present invention comprises a pneumatically-powered rotatable washing machine having a plurality of holding hooks on which paint brushes and rollers can be hung. The machine is designed to retain a quantity of paint thinner or solvent, and the rollers and brushes will then be suspended into the solvent during a cleaning operation. Additionally, wire baskets may be hung into the solvent, with the baskets performing the function of holding paint spray gun equipment and the like.

The present invention is particularly adapted for use in a shipboard environment which already includes a supply of high and low pressure air. This air is utilized to rotate the solvent holding drum within the washing machine and can continue in operation until the equipment is substantially clean. The used solvent is then pumped from the drum into a holding and filtering tank which removes contaminants so that the thinner can be reused. After the thinner has been pumped out of the machine, the air power supply can be used to again rotate the drum which results in a spin drying operation for the equipment contained therein.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto. Those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientists, engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

It is therefore an object of the present invention to provide a new and improved painting equipment cleaning apparatus which has all the advantages of the prior art painting equipment cleaning apparatuses and none of the disadvantages.

It is another object of the present invention to provide a new and improved painting equipment cleaning apparatus which may be easily and efficiently manufactured and marketed.

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It is a further object of the present invention to provide a new and improved painting equipment cleaning apparatus which is of a durable and reliable construction.

An even further object of the present invention is to provide a new and improved painting equipment cleaning apparatus which is susceptible of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale to the consuming public, thereby making such painting equipment cleaning apparatus economically available to the buying public.

Still yet another object of the present invention is to provide a new and improved painting equipment cleaning apparatus which provides in the apparatuses and methods of the prior art some of the advantages thereof, while simultaneously overcoming some of the disadvantages normally associated therewith.

Still another object of the present invention is to provide a new and improved painting equipment cleaning apparatus which is particularly adapted for shipboard use.

Yet another object of the present invention is to provide a new and improved painting equipment cleaning apparatus which includes the use of a pneumatically-powered equipment washing machine.

These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a perspective view of the painting equipment cleaning apparatus comprising the present invention.

FIG. 2 is a side elevation view, partly in cross-section, illustrating the operable components of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawings, and in particular to FIGS. 1 and 2 thereof, a new and improved paint equipment cleaning apparatus embodying the principles and concepts of the present invention and generally designated by the reference numeral 10 will be described.

More specifically, it will be noted that the paint equipment cleaning apparatus 10 essentially includes an equipment washing machine 12 having a solvent holding drum 14 rotatably mounted therein. In this regard, the drum 14 is designed to be substantially filled with a paint thinner or solvent 16, while a plurality of hooks or retaining clamps 18 are mounted around a periphery of the drum. The hooks 18 or retaining claims are designed to retain paint brushes and rollers in a suspended condition within the solvent 16. Additionally, one or more wire baskets 20 can be mounted interiorly of the drum

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14, with these baskets being suspended in the solvent 16 and being designed to retain other painting equipment such as paint spray gun nozzles, etc.

As illustrated, the drum 14 is mounted upon a rotatable shaft 22 and an opposed end of the shaft has an impeller 24 fixedly secured thereto. The impeller 24 is mounted within a chamber 26 forming a bottom portion of the washing machine 12, and a supply of compressed air 28 is selectively operable to effect a rotation of the impeller.

Mounted to the shaft 22 is a conventional washing machine discharge pump 30 which, in response to a timer mechanism, will withdraw the solvent 16 from the drum 14 and then discharge it into the top section of a solvent cleaning tank 32. The pump 30 includes a discharge connection 34, with solvent 16 being directed through a hollow interior portion of the rotatable shaft 22 and then being directed through an attached conduit 36 to the thinner holding tank 32.

The solvent cleaning tank 32 includes a plurality of manually removable disposable filtering screens 38, and the used solvent then filters through the screens into a bottom section 40 of the tank. A further pump 42 can then be selectively activated to remove solvent 16 from the holding section 40 and return it through the pump 30 into the drum 14 for reuse. Alternatively, a direction diverting valve 44 can be utilized to direct the reused solvent through a discharge line 46 when a further reuse thereof is impractical.

As to the manner of usage and operation of the present invention 10, the same should be apparent from the above description. However, a brief description thereof will be provided. In this respect, it can be appreciated that the present invention is particularly adapted for shipboard use in the U.S. Navy. Due to the large amount of painting and cleaning required in ships, the U.S. Navy does not have sufficient cleaning equipment available at all times, and a large amount of money is wasted on ruined paint brushes and rollers, as well as dirty cleaning solvent. Through the use of the present invention, a plurality of paint brushes and rollers can be attached to the hooks 18, or retaining clamps and other equipment can be deposited in a basket 20. A available air is then pumped through the conduit 28 to effect a rotation of the impeller 24 and this in turn effects a concurrent rotation of the drum 14 whereby the brushes, rollers, and the like are moved in an agitated manner within the solvent 16. After a preselected cleaning period has expired, the pump 30 may be actuated to remove the solvent 16 from the drum 14, and with the drum still spinning, the painting equipment is spun dry. By the same token, the paint solvent 16 is filtered through the disposable filters 38 within the cleaning tank 32 and is then available for several reuses before a discarding thereof.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the

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invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as being new and desired to be protected by Letters Patent of the United States is as follows:

1. A new and improved painting equipment cleaning apparatus comprising:

paint solvent holding tank means for containing paint solvent;

drum means rotatably mounted in said paint solvent holding tank means;

paint equipment holding means mounted in said drum means wherein said paint equipment holding means includes a series of individual securement members integrally mounted to an internal periphery of the drum means for securement of painting equipment, and

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pneumatic power supply means for selectively rotating said drum means to both cleanse and spin dry said painting equipment contained therein; and first pump means for selectively removing said paint solvent from said drum means after a use thereof, and

further including a separate cleaning tank means remotely positioned to said drum means for receiving said solvent removed from said drum by said first pump means, said cleaning tank means being operable to cleanse said solvent so as to make said solvent available for reuse, and

wherein said cleaning tank means includes a plurality of spaced filters overlying a solvent holding section for removing contaminants from said paint solvent, and

wherein said filters are disposable, and further including second pump means for removing said paint solvent from said solvent cleaning tank means, and

wherein said second pump means delivers said paint solvent back to said drum means for purposes of reuse.

* * * * *

EXHIBIT L



US005335394A

United States Patent [19]

Cunningham, Jr. et al.

[11] Patent Number: **5,335,394**[45] Date of Patent: **Aug. 9, 1994**

[54] EYEGLASS CLEANING APPARATUS

[76] Inventors: **James W. Cunningham, Jr.; Barbara A. Cunningham**, both of 3819 Florida Blvd., Palm Beach Gardens, Fla. 33410

[21] Appl. No.: **139,170**[22] Filed: **Oct. 20, 1993**[51] Int. Cl.³ **A47L 5/38**[52] U.S. Cl. **15/302; 15/310; 134/135**[58] Field of Search **15/302, 310; 134/135**[56] **References Cited****U.S. PATENT DOCUMENTS**

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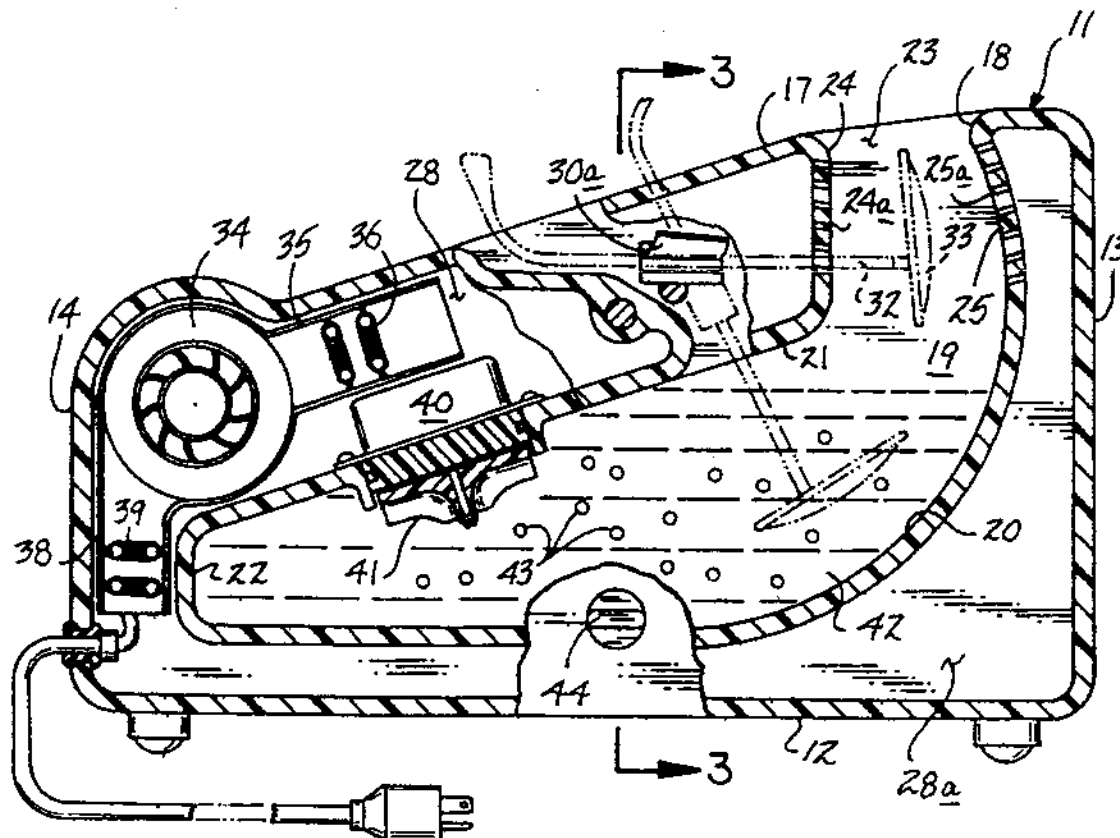
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Primary Examiner—Chris K. Moore*Attorney, Agent, or Firm*—E. Michael Combs[57] **ABSTRACT**

An apparatus wherein an oscillating motor and drive shaft arrangement selectively directs an eyeglass pair, and more specifically the lenses thereof, into a cleaning solution, having spherical resilient members therewithin to enhance cleaning. A timer mechanism after a predetermined timed event of cleaning maintains the lenses between front and rear walls of the entrance conduit into the fluid chamber, wherein heated drying air is directed onto the lenses of the eyeglass pair.

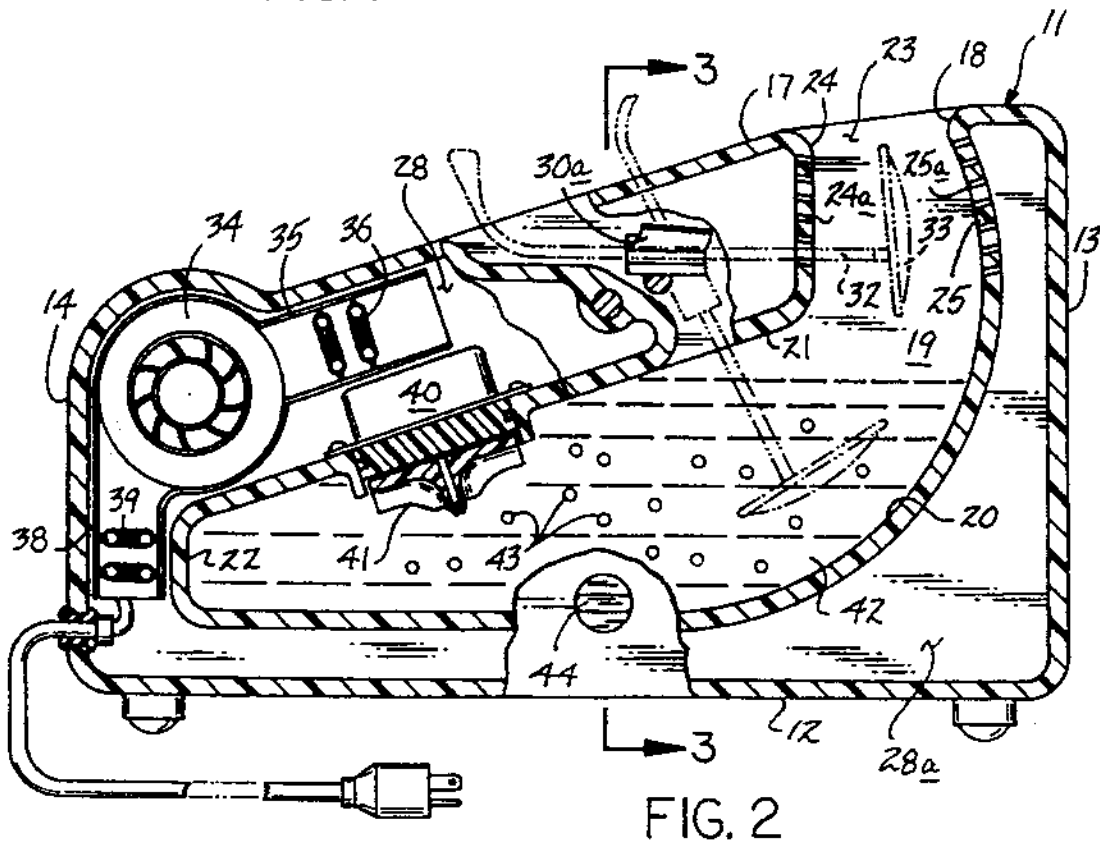
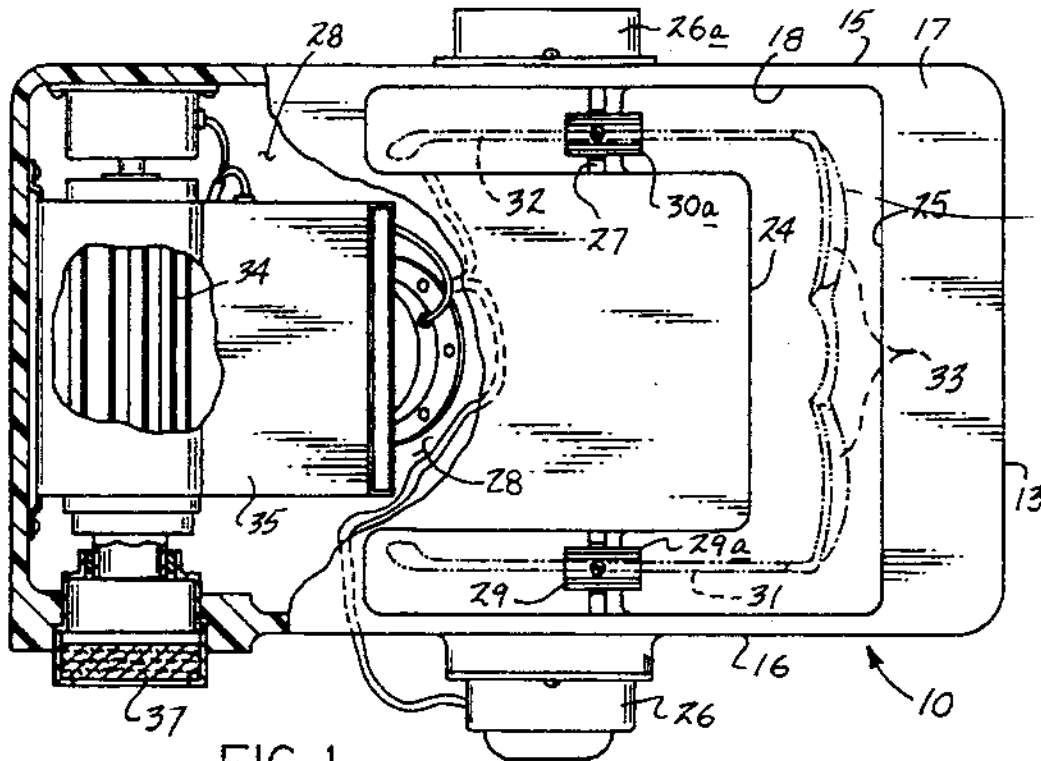
6 Claims, 4 Drawing Sheets

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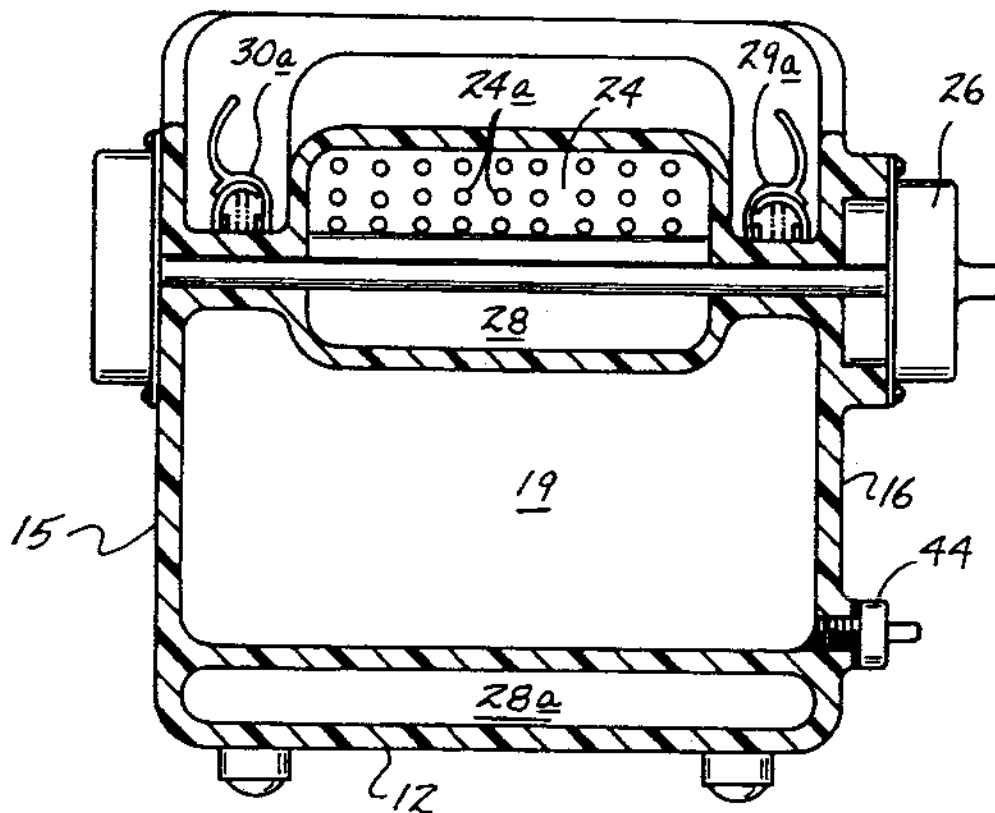


FIG. 3

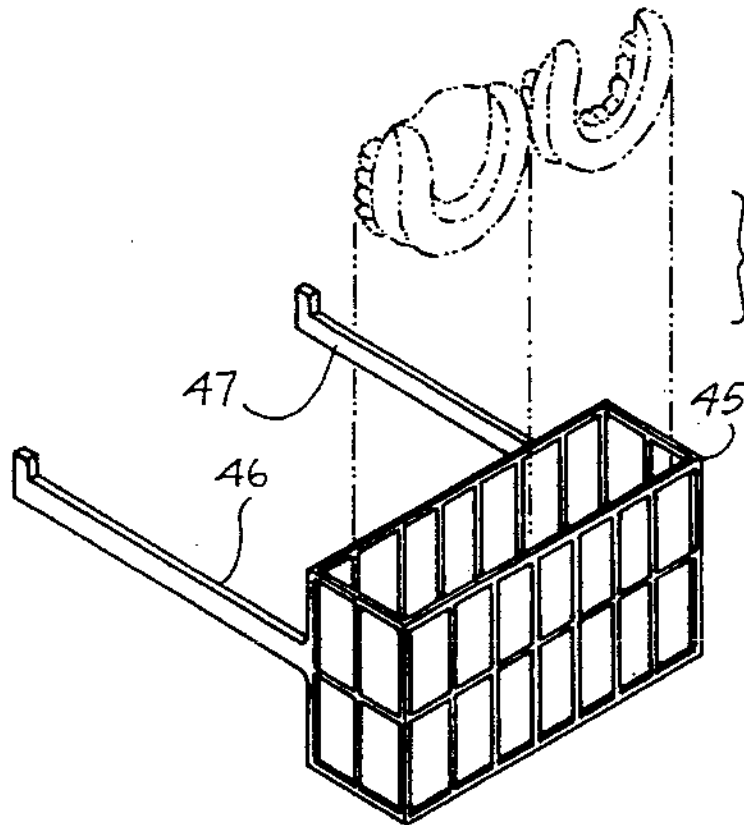


FIG. 4

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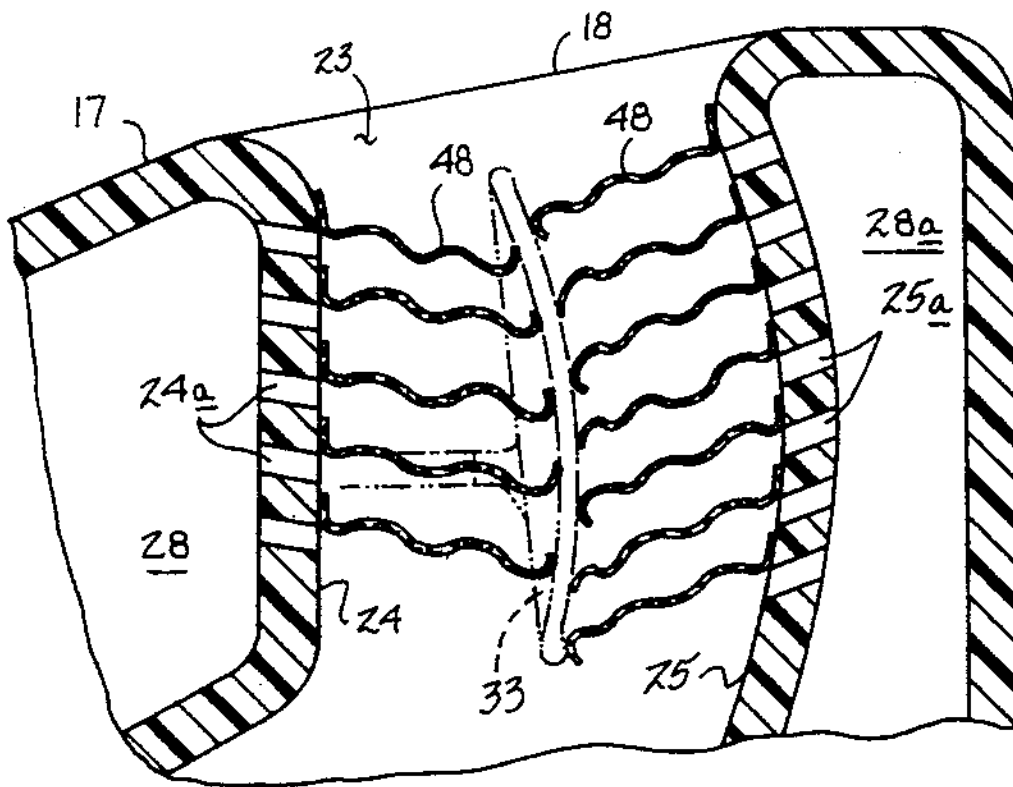


FIG. 5

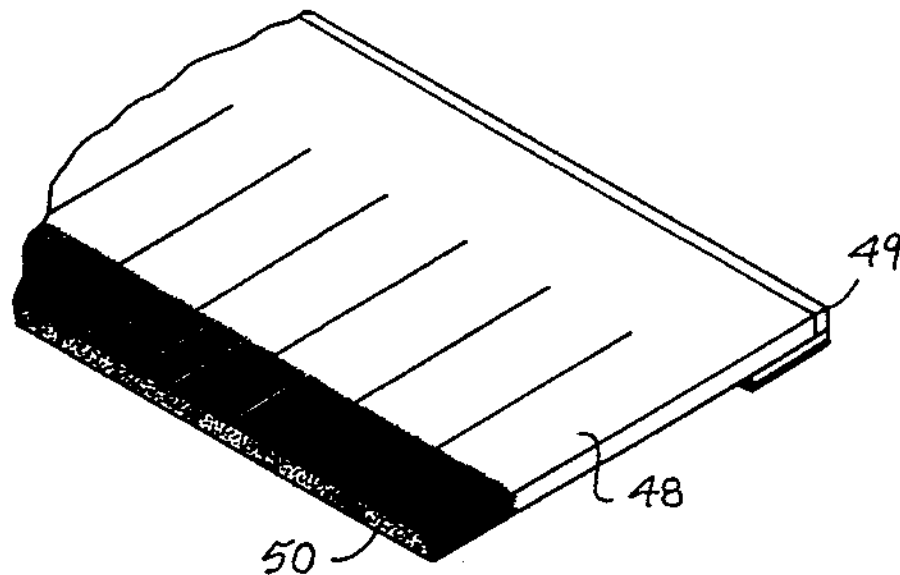


FIG. 6

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EYEGGLASS CLEANING APPARATUS**BACKGROUND OF THE INVENTION****1. Field of the Invention**

The field of invention relates to eyeglass cleaning apparatus, and more particularly pertains to a new and improved eyeglass cleaning apparatus providing for the oscillation of an eyeglass pair into a cleaning solution to enhance cleaning of lenses of the eyeglass pair.

2. Description of the Prior Art

Typical eyeglass cleaning, and more specifically cleaning of the lenses of an eyeglass pair, is undertaken by individuals in a manual manner providing inadequate surface cleaning of the lenses. Cleaning devices for such lenses has been indicated in the prior art in U.S. Pat. No. 3,480,022 as opposed to the manual cleaning of lenses as indicated in the U.S. Pat. No. 5,000,204.

The instant invention attempts to overcome deficiencies of the prior art by providing not only the agitation of a cleaning solution about eyeglass lenses but the oscillation of the lenses through the cleaning solution for enhanced cleaning and removal of cleaning solution from the lenses and positioning of the lenses for their subsequent drying and in this respect, the present invention substantially fulfills this need.

SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of eyeglass cleaning apparatus now present in the prior art, the present invention provides an eyeglass cleaning apparatus wherein eyeglasses are oscillated relative to a cleaning solution and are subsequently oriented for a drying relative to heated directed air onto the lenses. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved eyeglass cleaning apparatus which has all the advantages of the prior art eyeglass cleaning apparatus and none of the disadvantages.

To attain this, the present invention provides an apparatus wherein an oscillating motor and drive shaft arrangement selectively directs an eyeglass pair, and more specifically the lenses thereof, into a cleaning solution, having spherical resilient members therewithin to enhance cleaning. A timer mechanism after a predetermined timed event of cleaning maintains the lenses between front and rear walls of the entrance conduit into the fluid chamber, wherein heated drying air is directed onto the lenses of the eyeglass pair.

My invention resides not in any one of these features per se, but rather in the particular combination of all of them herein disclosed and claimed and it is distinguished from the prior art in this particular combination of all of its structures for the functions specified.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto. Those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the

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claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientists, engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

It is therefore an object of the present invention to provide a new and improved eyeglass cleaning apparatus which has all the advantages of the prior art eyeglass cleaning apparatus and none of the disadvantages.

It is another object of the present invention to provide a new and improved eyeglass cleaning apparatus which may be easily and efficiently manufactured and marketed.

It is a further object of the present invention to provide a new and improved eyeglass cleaning apparatus which is of a durable and reliable construction.

An even further object of the present invention is to provide a new and improved eyeglass cleaning apparatus which is susceptible of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale to the consuming public, thereby making such eyeglass cleaning apparatus economically available to the buying public.

Still yet another object of the present invention is to provide a new and improved eyeglass cleaning apparatus which provides in the apparatuses and methods of the prior art some of the advantages thereof, while simultaneously overcoming some of the disadvantages normally associated therewith.

These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is an orthographic top view of the invention.

FIG. 2 is an orthographic cross-sectional illustration of the invention.

FIG. 3 is an orthographic view, taken along the lines 3—3 of FIG. 2 in the direction indicated by the arrows.

FIG. 4 is an isometric illustration of an accessory basket structure employed by the invention.

FIG. 5 is an orthographic cross-sectional illustration of accessory cleaning bristle members arranged for employment by the invention.

FIG. 6 is an isometric illustration of cleaning bristles arranged for severance and removal relative to a web.

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DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawings, and in particular to FIGS. 1 to 6 thereof, a new and improved eyeglass cleaning apparatus embodying the principles and concepts of the present invention and generally designated by the reference numeral 10 will be described.

More specifically, the eyeglass cleaning apparatus 10 of the instant invention essentially comprises a housing 11 having a housing bottom wall 12 spaced from a housing front wall 13, a housing rear wall 14 spaced from a housing front wall 13, and first and second side walls 15 and 16 and spaced apart relative to one another, with a top wall 17 extending over the bottom wall 12 between the front and rear walls 13 and 14. The top wall 17 is arranged with a top wall U-shaped opening 18, with the U-shaped opening 18 having a first opening portion parallel to the front wall 13, with the U-shaped opening including second and third portions adjacent and parallel the respective first and second side walls 15 and 16 in communication with the first opening portion. As illustrated in FIG. 1 for example, the first portion receives the bridge work portion of the eyeglass assembly, while the second and third opening portions receive the legs of the eyeglass assembly directed therethrough. A fluid chamber 19 is positioned within the housing, having a chamber arcuate floor 20 spaced from the housing floor 12, with the chamber arcuate floor 20 extending along the housing front wall 13, with the fluid chamber 19 further having a chamber top wall 21 and a chamber rear wall 22. The chamber rear wall 22 is arranged in a spaced relationship relative to the housing rear wall 14, while the chamber top wall 21 extends along the housing top wall 17 and directed into an entrance conduit 23 that extends from the housing top wall to the fluid chamber 19, having entrance conduit rear wall 24 in communication with the fluid chamber top wall 21, with the entrance conduit front wall 25 extending to the fluid chamber arcuate floor 20. The entrance conduit rear wall includes rear wall openings 24a, with an entrance conduit front wall 25 including a matrix of front wall openings 25a. The rear wall and front wall openings 24a and 25a respectively are positioned on opposed sides of the eyeglass lenses 33 that are oriented, in a manner as indicated in phantom in FIG. 2, in a horizontal orientation prior to and subsequent the bathing procedure of the eyeglass assembly. The eyeglass assembly includes eyeglass first and second legs 31 and 32 that are arranged for mounting upon respective first and second clamps 29 and 30 that in turn are fixedly mounted to the drive motor shaft 27 of a self-reversing drive motor 26. The drive motor 26 may be either electrical or mechanical in nature. The drive motor 26 is arranged for oscillation of the drive motor shaft 27, wherein a timer mechanism 26a in electrical communication to the drive motor and in support of the shaft 27 (see FIG. 3) effects maintaining of the first and second clamps 29 and 30 in a horizontal orientation subsequent to the oscillation of the eyeglass assembly to present the eyeglasses, in a manner as indicated in phantom in FIG. 2, in the horizontal orientation from the bathing event and its oscillation within the cleaning fluid 42. It should be noted that the cleaning fluid 42 is formed with a plurality of resilient spheres 43 positioned therethrough. The resilient spheres 43 may be formed of a silicone-like material to enhance cleaning agitation onto the lenses of the eyeglass assembly. A drain plug 44 is arranged for projec-

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tion through the second side wall 16 permitting ease of removal of the cleaning fluid from the fluid chamber 19 (see FIG. 3). Respective first and second clamps 29 and 30 include respective first and second clamp hook and loop fastener webs 29a and 30a (see FIG. 3) for securing of the respective first and second eyeglass legs to the respective first and second clamps.

A blower motor 34 is mounted within a first pneumatic chamber 28 positioned within the housing between the fluid chamber top wall 21 and the housing top wall 17, and extending from the housing rear wall 14 to the entrance conduit rear wall 24. A second pneumatic chamber 28a is positioned between the fluid chamber arcuate floor 20 and the housing bottom wall 12, with the second pneumatic chamber extending from there to an orientation along the housing front wall 13 extending to the entrance conduit front wall 25. The blower motor 34 includes a first outlet conduit 35 in a facing relationship relative to the entrance conduit rear wall 24 to direct heated air from the first outlet conduit 34 extending through first heating coils 36 that are in turn mounted within the first outlet conduit 35. A second outlet conduit 38 in communication with the blower motor 34 extends to pneumatic communication with the second chamber 28a, with the second outlet conduit 38 having second heating coils 39 therewithin to direct heated air into the second chamber 28a, and wherein the first and second chambers direct such heated air to the respective matrix of rear and front wall openings 24a and 25a. An inlet screen 37 projecting beyond the second side wall 16 directs filtered air into the blower motor, which is of a typical centrifugal type, and the blower motor of the invention including the first and second outlet conduits cooperating with respective first and second pneumatic chambers 28 and 28a respectively.

It should be further noted that an agitation drive member 40 projects into the fluid chamber 19, with the agitation drive member 40 having impellers 41 to effect agitation of the resilient spheres 43 within the cleaning fluid 42. The cleaning fluid 42 may be of any commercially available type for cleaning glass and the like.

The FIG. 4 indicates the invention arranged to permit the cleaning of dentures and to this end, a basket 45 having respective basket first and second legs 46 and 47 is arranged such that the first and second basket legs 46 and 47 are arranged for mounting to the respective first and second clamps 29 and 30.

The FIG. 7 indicates that the front and rear entrance conduit walls 24 and 25 are arranged to further include a plurality of resilient cleaning legs 48 extending therefrom, with the resilient cleaning leg extending from each of the entrance conduit rear and front walls 24 and 25 to engage the eyeglass lens. Each of the cleaning legs 48 are formed of a resilient material, having an adhesive rear end wall 49, such as indicated in FIG. 6, wherein a web of such resilient cleaning legs 48 as indicated are separated along the slots and adhered to respective front and rear walls by the adhesive or other desired mechanical connection. Resilient bristles 50 extend from the front end wall portion of each of the resilient cleaning legs 48. It should be noted that the resilient cleaning legs adhesive rear end walls 49 are arranged for mounting between individual ones of the respective rear and front wall openings 24a and 25a, as illustrated.

It should be noted that a timer mechanism is arranged to simultaneously effect actuation of the blower motor to permit subsequent drying of the eyeglass lenses sub-

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sequent to the oscillation of the eyeglass lenses within the cleaning solution. If desired to simplify operation of the device, the drying procedure to include the actuation of the blower motor may be operated in concert with the oscillation of the drive motor, but to minimize use of the blower motor, it is preferred to have the drying sequence occur subsequent to the oscillation of the eyeglass assembly within the cleaning solution.

As to the manner of usage and operation of the instant invention, the same should be apparent from the above disclosure, and accordingly no further discussion relative to the manner of usage and operation of the instant invention shall be provided.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as being new and desired to be protected by Letters Patent of the United States is as follows:

1. An eyeglass cleaning apparatus, comprising,
 - a housing, said housing having a housing bottom wall spaced from a housing front wall, a housing rear wall spaced from said housing front wall, and a housing first side wall spaced from a housing second side wall, and a housing top wall extending over the housing bottom wall, the top wall including a top wall U-shaped opening extending into the housing, and
 - a fluid chamber mounted within the housing, with the fluid chamber in communication through the housing top wall to include an entrance conduit, with the fluid chamber including an arcuate floor spaced from the housing bottom wall extending along the housing bottom wall and spaced from the housing front wall, and
 - the fluid chamber having a fluid chamber rear wall spaced from the housing rear wall, and a fluid chamber top wall spaced from the housing top wall, with a first pneumatic chamber oriented between the housing top wall and the fluid chamber top wall, and a second pneumatic chamber oriented between the housing bottom wall and the fluid chamber arcuate floor, with the second pneumatic chamber extending between the fluid chamber arcuate floor and the housing front wall, and

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the entrance conduit including an entrance conduit rear wall having rear wall openings in pneumatic communication with the first pneumatic chamber, and the entrance conduit having an entrance conduit front wall having front wall openings, with the front wall openings in pneumatic communication with the second pneumatic chamber, and blower means mounted within the first pneumatic chamber, the blower means having a first outlet conduit directing pressurized air to the rear wall openings, and a second outlet conduit in pneumatic communication with the blower motor directing pressurized air into the second pneumatic chamber and through the front wall openings, and

a self-reversing drive motor mounted to the housing, having a drive motor shaft, with the drive motor shaft extending through the housing first side wall and the housing second side wall, and the shaft having a first clamp and a second clamp, the top wall wall U-shaped opening including a first opening portion extending to the entrance conduit, and the top wall U-shaped opening including a second opening portion positioned in adjacency to the first side wall and a third opening portion extending in adjacency to the second side wall, with the first clamp mounted within the second opening, and the third clamp mounted within the third opening, with the first clamp and the second clamp arranged to secure respective first and second legs of an eyeglass assembly therebetween, with the eyeglass assembly including eyeglass lenses arranged for oscillation into the fluid chamber.

2. An apparatus as set forth in claim 1 wherein the fluid chamber includes a cleaning fluid therewithin, the cleaning fluid including resilient spheres positioned within the cleaning fluid.

3. An apparatus as set forth in claim 2 wherein the fluid chamber top wall includes an agitation drive member, and the agitation drive member including fluid impellers extending into the fluid chamber arranged to effect agitation within the fluid chamber.

4. An apparatus as set forth in claim 3 wherein the blower motor first outlet conduit includes first heating coils positioned therewithin, and the blower motor second outlet conduit includes second heating coils positioned therewithin to direct selective heated air into the first pneumatic chamber and second pneumatic chamber respectively.

5. An apparatus as set forth in claim 4 further including a basket, the basket including a basket first leg and a basket second leg, the basket first leg arranged for securement to the first clamp, and the basket second leg arranged for securement to the second clamp.

6. An apparatus as set forth in claim 5 wherein the entrance opening rear wall and the entrance opening front wall each include a plurality of resilient cleaning legs, with each resilient cleaning leg arranged for extension into the entrance conduit.

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EXHIBITS M-U
FILED UNDER SEAL